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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,815

08/17/2006

Tohru Kato

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01/16/2009

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EXAMINER

BELL, BRUCE F

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

01/16/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,815	<b>Applicant(s)</b> KATO ET AL.	
	<b>Examiner</b> Bruce F. Bell	<b>Art Unit</b> 1795	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/17/06</u> .   | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-14 rejected under 35 U.S.C. 102(b) as being anticipated by Fujimura et al (2004/0124095).

Fujimura et al disclose producing high purity hydrogen that is recovered from a pyrolysis gas composed mainly of hydrogen and carbon monoxide, produced by pyrolysis of an organic material such as biomass. A method for producing high purity hydrogen includes supplying a reducing gas produced by pyrolysis of an organic material to an anode side of a high temperature steam electrolyzer having a diaphragm comprising solid oxide electrolyte and supplying steam to a cathode side of the high temperature steam electrolyzer to produce hydrogen and oxygen by electrolytic action. The oxygen produced in the cathode side of the high temperature electrolyzer passes through the solid oxide electrolyte and reacts with the reducing gas to create concentration gradient of oxygen ion which lowers the electrolysis voltage. See abstract. Pyrolysis gas 8 is distributed through a flow control valve 9 to a line 10 and a line 11 in controlled distributed amount. The gas flowing through line 10 is supplied to an anode side 15 of the high temperature steam electrolyzer and the gas flowing through line 11 is stored in a gas reservoir. The high temperature steam electrolyzer is partitioned into an

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anode side 15 and cathode side 16 by a solid oxide electrolyte. High temperature steam 19 is supplied to the cathode side 16 and is electrolyzed into hydrogen 20 and oxygen 21. Oxygen 21 passes through the solid oxide electrolyte and moves to the anode side 15 by potential driving force. Hydrogen 20 is recovered from the cathode side 16 of the electrolyzer 13. Oxygen reacts with the reducing pyrolysis gas 8 and is consumed in the anode side 15 and concentration gradient of oxygen ions is created to lower the electrolysis voltage required for the electrolysis of water, to reduce the power consumption. High temperature exhaust gas 22 generated passes through a heat exchanger 23 and steam 6 produced in the heat exchanger 23 is utilized as a fluidizing gas of the pyrolysis fluidized bed 2, wherein the pyrolysis gas is produced and controlled in an amount being directed to the anode side by flow control valves 9 so as to maintain and optimize the conditions to meet input electric energy and the quantity of generated hydrogen. See paragraphs 0028-0035.

The prior art of Fujimura et al anticipates the applicants instant invention as set forth above with respect to the teachings of Fujimura et al with respect to the instant claims as presented. The prior art of Fujimura et al sets forth that the anode off gas is distributed to a pyrolysis bed and is combusted to form hydrogen and CO to reintroduce back to the anode side and further sets forth that by doing this and by introducing steam to the cathode, that lower energy consumption of the cell is accomplished and reduction of carbon onto the anode is achieved which is what applicants instant invention appears to be accomplishing. The patent publication further sets forth control valves to be used in conjunction with the distribution of the off gas to the fluidized bed and to the anode

inlet so as to optimize the conditions within the electrolyzer. Therefore, the prior art of Fujimura et al anticipates the applicants instant claims as set forth.

The prior art of Fujimura et al is presently used as a 35 USC 102(b) reference since a certified English translation of the PCT document and/or the foreign priority documents has not been provided. Should the applicants decide that such a translation will further prosecution, the examiner would like to point out that the Fujimura et al patent would be used in a further rejection under 35 USC 102(e) since the filing date of this patent publication is before that of the foreign priority documents.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimura et al (2004/0124095).

Fujimura et al is as disclosed above in the 35 USC 102(b) rejection above.

Fujimura et al does not disclose the equimolar ratio with respect to the number of moles as carbon of the hydrocarbon containing gas as set forth in these two claims.

The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the instant invention was made because the prior art of Fujimura et al sets forth controlling the system gas flows utilizing valves to maintain and operated the electrolyzer under optimum conditions to meet the electric energy input and quantity

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of hydrogen needing to be produced. Therefore, one having ordinary skill in the art would have the knowledge to optimized the system using routine experimentation in order to meet the conditions set forth in the Fujimura et al patent publication and would find the equimolar ratio based on these conditions. Therefore, the prior art of Fujimura et al renders the applicants instant claims obvious for the reasons set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce F. Bell whose telephone number is 571-272-1296. The examiner can normally be reached on Monday-Friday 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BFB  
January 15, 2009

/Bruce F. Bell/  
Primary Examiner, Art Unit 1795

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